

REMARKS

SUMMARY:

Claims 6-7 and 9-12 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,215,372 (Novak). Claims 8 and 13 stand rejected under 35 U.S.C. §103(a) as being unpatentable as obvious solely over Novak.

Responses to the characterizations summarized above and traversal of the stated prior art rejection grounds are respectfully hereafter presented with respect to each individual aspect of the Office Action.

BACKGROUND CASE LAW RE 35 U.S.C. §102 & §103:

Before setting forth a discussion of the rejection grounds applied in the most recent non-Final Office Action, it is respectfully submitted that controlling case law has frequently addressed rejections under Sections 102 and Section 103.

"For a prior art reference to anticipate in terms of 35 U.S.C Section 102, every element of the claimed invention must be identically shown in a single reference." Diversitech Corp. v. Century Steps, Inc., 850 F.2d 675, 677, 7 U.S.P.Q.2d 1315, 1317 (Fed Cir, 1988; emphasis added). The disclosed elements must be arranged as in the claim under review. See Lindemann Machinefabrik v. American Hoist & Derrick Co., 730 F.2d 1452, 1458, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984). If any claim, element, or step is absent from the reference that is being relied upon, there is no anticipation. Kloster Speedsteel AB v. Crucible, Inc., 793 F.2d 1565, 230 U.S.P.Q. 81 (Fed. Cir. 1986). Anticipation under 35 U.S.C. Section 102 requires that there be an identity of invention. See Shatterproof Glass Corp. v. Libbey-Owens Ford Co., 758 F.2d 613, 225 U.S.P.Q. 635, 637 (Fed. Cir. 1985). In PTO proceedings, claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art. In re Sneed, 710 F.2d 1544, 1548, 218 U.S.P.Q. 385, 388 (Fed. Cir. 1983).

In addition to the well-known required multi-step analysis of Graham v. John Deere Co., 381 U.S. 1, 148 U.S.P.Q. 459 (S. Ct. 1966), and its progeny, the Court of

Appeals for the Federal Circuit has on numerous occasions offered its guidance concerning the propriety of Section 103 rejections.

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of references can be combined only if there is some suggestion or incentive to do so. (emphasis original)

ACS Hospital Systems, Inc. v. Montefiore Hospital, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984).

The task of the Patent Office is essentially a burden of proof not just to show prior patents with selected elements similar to respective parts of a claimed combination, but to show teachings to support obviously combining the elements in the manner claimed.

Virtually all inventions are necessarily combinations of old elements. The notion, therefore, that combination claims can be declared invalid merely upon finding similar elements in separate prior patents would necessarily destroy virtually all patents and cannot be the law under the statute, ' 103. (footnotes omitted)

Panduit Corp. v. Dennison Manufacturing Co., 1 U.S.P.Q. 2d 1593, 1603 (Fed. Cir. 1987).

In In re Deminski, 230 U.S.P.Q. 313 (Fed. Cir. 1986), the court reversed a Patent Office Board of Appeals decision rejecting claims for obviousness, saying: "There [was] nothing in the prior art references, singly or in combination, 'to suggest the desirability, and thus the obviousness' of the [claimed subject matter]." Id. at 315; emphasis original. The court noted that the relied-on reference did not address the technical problem addressed by the claimed invention (and in fact taught away from the Applicant's invention), and stated the well-established principle that "[h]indsight analysis is clearly improper. . . ." Id. at 316.

In Bausch & Lomb v. Barnes-Hind/Hydrocurve, 230 U.S.P.Q. 416 (Fed. Cir. 1986), the court vacated a district court holding of invalidity for obviousness. In doing

so, the district court was criticized for viewing teachings from the prior art in isolation, instead of considering the prior art references in their entirety; for entering the tempting but forbidden zone of hindsight analysis; for failing to view the claimed invention as a whole; and for disregarding express claim limitations. Id. at 419, 420.

It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one skilled in the art. (citations omitted)

Bausch & Lomb v. Barnes-Hind/Hydrocurve, 230 U.S.P.Q. 416, 419 (Fed. Cir. 1986). (emphasis added)

The Supreme Court in Graham and Adams . . . foreclosed the use of substitutes for facts in determining obviousness under section 103. The legal conclusion of obviousness must be supported by facts. [footnote omitted] Where the legal conclusion is not supported by facts, it cannot stand. . . .

A rejection based on section 103 clearly must rest on a factual basis, and these facts must be interpreted without hindsight reconstruction of the invention from the prior art. . . . It [the Patent Office] may not, because it may doubt that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in its factual basis. . . .

[W]e may not resolve doubts in favor of the Patent Office determination when there are deficiencies in the record as to the necessary factual bases supporting its legal conclusion of obviousness. (emphasis original)

In re Warner, 379 F.2d 1011, ___, 154 U.S.P.Q. 173, 177, 178 (C.C.P.A. 1967).

Finally, the PTO Board of Appeals noted the following in Ex parte Clapp:
"[S]implicity and hindsight are not proper criteria for resolving the issue of obviousness."
" Ex parte Clapp, 227 U.S.P.Q. 972, 973 (PTO Bd. App. 1985).

REJECTION OF ORIGINAL CLAIMS 6-7 AND 9-12 (35 U.S.C. §102(e)):

Original claims 6-7 and 9-12 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,215,372 (Novak). Based on the present subject matter of such claims, and the following remarks, Applicants respectfully traverse such alleged anticipation and respectfully request withdrawal of such rejections.

Original claims 6-12 are directed to a method for adjusting the equivalent series resistance (ESR) of a multi-layer **component**. The method includes providing various **layers** in a multi-layer component, **including a resistive layer**, and then **adjusting properties of the resistive layer to vary the ESR of the component**.

The original specification, including in lines 15-25 of page 19 thereof, sets forth one example that discusses more particular aspects of a technique as set forth in claims 6-12. With reference to Fig. 1B of the subject application, an insulating (dielectric) layer 22 and resistive barrier layer 34 are provided between a bottom electrode 20 and a top electrode 24 (which are respective conductive layers). Respective arrays of circular openings are provided in the top electrode layer 24 and in the resistive layer 34. By forming the circular openings in electrode layer 24 larger than the respective openings in resistive layer 34, additional portions of resistive layer 34 are exposed. More exposure of the resistive layer 34 increases the ESR of the multilayer component. Selection of this exposure area can serve to “tune” the ESR of the multilayer component, making it possible to design and provide a component that reduces potential ringing in a resultant circuit application.

The subject Office Action asserts that Novak discloses all elements of independent claim 6, including providing various electrically conductive layers, insulating layers and a resistive layer as well as adjusting ESR of the component. Such overall position of the USPTO is respectfully traversed, inasmuch as there are several differences between the subject matter disclosed in Novak and the subject claimed methods. The Office Action states in pertinent part:

With regard to claim 6, Novak teaches a method for reducing electrical resonances and

noise propagation in multilayer board, comprising:

- producing a multilayer component (Fig. 6, 600) including at least first and second electrically conductive layers (Fig. 6, items 602, 604, 606 or 608) separated by an insulating layer (Fig. 6, items 610, 612 or 614);
- providing a resistive layer (Fig. 6, 650 or 652) with the insulating layer and the first and second electrically conductive layers; and
- adjusting the ESR (Col. 8, lines 59-61; col. 9, lines 5-20) of the component by varying the effective resistance of the resistive layer.

In general, Novak concerns a multilayer substrate or circuit board, which is an element on which integrated circuits are often built. This is a generally different technology from multi-layer components, the focus of the presently claimed subject matter. The importance of such basic distinction between circuit substrates and multi-layer components should be better appreciated from the following additional discussion of the Novak reference and the present claims.

Just as one practical example of such basic distinction, there are several orders of magnitude difference in size between the two technologies. For example, Novak column 2, lines 41-49 describe the FR4 circuit as being on the order of 10 inches on a side. While the present application does not focus on the subject of size per se, those of ordinary skill in the art would appreciate that present components would be on the order of 0.1 inches. Likewise, the Novak part would for example consist of relatively thick copper (about 1.4 mils per the above specification reference to Novak) and FR4, about 2 mils, while the present subject matter would more typically use silicon substrates, and have features measured in microns.

Still further, in the Novak part, the resistive elements are in essence “buried” in the board, within “capacitive islands”, well away from the components, while in the present subject matter, resistors are intimate with effective connections.

The subject Office Action literally equates capacitive islands 650 and 652 of Novak with the resistive layer subject matter set forth in claim 6 by stating: “providing a resistive layer (Fig. 6, 650 or 652).”

It is respectfully **not accurate** to characterize capacitive **islands** 650 or 652 as a “resistive **layer**”. A layer, as defined in Webster’s New Collegiate Dictionary, Ninth Edition, is “one thickness, course, or fold laid or lying over or under another.” This definition is representative of the ordinary meaning of the term layer. As layers are generally understood and as also described in both the subject application and in the Novak patent, capacitive **islands** 650 and 652 are not separate **layers**, but an integral portion of another layer.

Likewise, the Office Action position should not view such **capacitive** islands 650 and 652 as the same as the **resistive** layers of the present subject matter, and there is no adequate justification for doing so. To persist in either of such positions is to respectfully fall prey to the improper practice of hindsight application of references.

Based on the above distinctions, Applicants respectfully submit that the capacitive islands in Novak do not correspond to a “resistive layer” separate from electrically conductive layers and an insulating layer. Therefore, as a matter of law, Novak can not anticipate the pertinent claimed subject matter.

Claim 6 also sets forth the step of adjusting the ESR of a component by varying the effective resistance of the resistive layer. Numbered page 3 of the September 14, 2005 Office Action asserts that such step is disclosed in Novak in col. 8, lines 59-61, and col. 9, lines 5-20. **However**, col. 9, lines 5-20 of Novak respectfully refer to an additional resistor 906, **not** the capacitive islands previously equated with the resistive layer of claim 6.

In further contrast, col. 8, lines 59-61 of Novak do refer to the capacitive islands, but describe selecting/varying a value of the capacitance C of the high dielectric islands, not the ESR of the islands. Although the capacitive island will have an ESR associated with it, such parameter is **not** one that is intentionally adjusted or varied by Novak in accordance with a desire to tune circuit resonancy. Novak discloses the selection of varied **capacitance** values in order to effect certain circuit performance characteristics, which is a different parameter than **resistance**.

Again, as a matter of law, Novak can not be relied on for the anticipation alleged in the subject Office Action.

Claim 6 sets forth the steps of producing a multilayer component including at least first and second electrically conductive layers separated by an insulating layer, and providing a resistive layer layered with the insulating layer and the first and second electrically conductive layers. The subject Office Action equates planar conductors 602, 604, 606 or 608 of Novak with the electrically conductive layers of claim 6, and layers 610, 612 or 614 with the insulating layer of claim 6.

First, if one assumes that layers 610, 612 or 614 are dielectric layers, then such layers are still not the insulating layer subject matter of claim 6.

Furthermore, Applicants respectfully note that layers 610, 612 and 614 are not explicitly mentioned and discussed in the subject Novak specification. In fact, if one perceives for example that layer 612 is “analogous” to layer 412, it is noted that layer 412 is variously referred to as “a second dielectric layer 412” (Novak, Col. 5, line 65), a “first signal planar conductor 412” (Novak, Col. 6, line 7), the “insulating layer 412” (Novak, Col. 6, line 37), and “the core laminate 412” (Novak, Col. 6, lines 46-47).

Based on the above distinctions, Applicants respectfully submit that Novak fails to disclose all elements of independent claim 6, especially the provision of a distinct resistive layer among the first and second electrically conductive layers and insulating layer, as well as the step of adjusting the ESR of the component by varying the effective resistance of the resistive layer. As such, Novak as a matter of law can not anticipate present claim 6, and such present claim 6 should be found as patentable over the Novak reference.

Since claims 7-12 further depend from claim 6, which should otherwise be allowable per the foregoing, and further limit same, claims 7-12 should also be allowable over Novak, and Applicants respectfully request acknowledgement of same.

Concerning dependent claim 7, Applicants note that the capacitive islands 650, 652 of Novak (which are equated per the Office Action with a resistive layer) are not provided “between the insulating layer and one of the first or second electrically

conductive layers", as set forth in such claim 7. The Novak capacitive islands 650, 652, which are an integrated part of insulating layer 612, are provided between conductive layers 604 and 606, not in between an insulating layer and a conductive layer.

Dependent claims 9 and 11 are directed to adjusting the thickness of the resistive layer in a multilayer component. The subject Office Action states that value h in Fig. 1 of Novak is the thickness of the resistive layer, and that such value can be varied.

However, Col. 10, line 50 of Novak describes h as the thickness of the **insulating** layer. Such fact further demonstrates that the capacitive islands 650, 652 of Novak must be part of such layer.

The above-described insulating layer and resistive layers in present claims 9 and 11 are respectively different features of such claims. Therefore, the indicated description in Novak cannot anticipate present claims 9 and 11.

With reference to dependent claims 10 and 12, the subject Office Action states in pertinent part:

With **regard** to claims **10 and 12**, Novak teaches that the adjusting step comprises:

- varying the effective resistance of the resistive layer by adjusting the composition of the resistive layer (Col. 9, lines 5-20).

However, the cited discussion of Novak does not relate to adjustments of a resistive layer, but instead adjustments to a high dielectric island. Therefore, such subject matter should not be regarded as a matter of law as anticipating the presently claimed subject matter.

REJECTION OF CLAIMS 8 and 13 (35 U.S.C. §103(a)):

Claim 8 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Novak. Specifically, the subject Office Action states in pertinent part:

With **regard to claim 8**, Novak teaches a method for reducing electrical resonances and noise propagation in multilayer board, including the adjusting steps of:

- perforating one of the first or second electrically conductive layers (Fig. 10, items 1002, 1004, 1006 or 1008) with a plurality of through-holes (Fig. 10, 1022 or 1024);
and

- varying the effective resistance of the resistive layer by adjusting capacitive islands (Fig. 6, 652 or Fig. 10, 1052) at selected areas or distances from vias (Fig. 6, 622 or Fig. 10, 10220) whereby the extent of coverage of the perforated electrode varies the effective resistance of the resistive layer, except for detailing these selected areas or distances as varying and spacing diameters of through-holes.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to consider these selected areas or distances as varying and spacing diameters of through-holes, which can vary and match the impedance of the multilayer circuit in order to reduce noise and any ground bounce signal.

As previously described, the subject application discusses forming circular openings in one of the electrically conductive layers larger than the respective openings in an adjacent resistive layer, thereby exposing additional portions of the resistive layer and increasing the ESR of the multi-layer component. Such unique selection of the amount of coverage of the perforated conductive layer relative to the adjacent resistive layer is what enables the “tuning” or selection of a desired ESR value.

The Examiner admits that the above features are not disclosed in Novak. Further, it is respectfully submitted they are not simply “obvious” features, as the Examiner alleges. Per pertinent case law, every element of the claims must be disclosed in a reference or combination of references.

Every element of claim 8, especially the step of adjusting the diameter of through-holes of an electrically conductive layer relative to a resistive layer, is **not** disclosed in Novak. The Office Action does **not** point to any place in Novak or another reference that discusses this feature. The Office Action also fails to point to a specific disclosure in Novak that purportedly provides any suggestion or motivation for “obviously” modifying the technology of Novak in a way as set forth in original claim 8.

In particular, the so-called “through-holes (Fig. 10, 1022 or 1024)” are power vias which surround a high dielectric constant island 1052 and which connect to a component 1018. See Novak, col. 9, lines 45-49. In addition, placement of such power vias is a distinct consideration for Novak, relative to placement of signal vias or placement of high dielectric constant islands. See Novak, col. 9, lines 32-45.

Therefore, there is an entirely different character and purpose of the subject matter of Novak than that for which it is allegedly depended on as allegedly invalidating the present subject matter. Applicants respectfully submit that under such circumstances, the 35 U.S.C. §103(a) rejection of original claim 8 is inappropriate, and withdrawal of such rejection is respectfully requested.

Claim 13 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Novak. Specifically, the subject Office Action states in pertinent part:

With regard to claim 13, Novak teaches a method for reducing electrical resonances and noise propagation in multilayer board, which reads on applicants' claimed invention, including:

- producing a multilayer component (Fig. 6, 600) having a plurality of successively stacked electrode layers (Fig. 6, items 602, 604, 606 or 608);
- providing separate insulating layers (Fig. 6, items 610, 606 or 614) sandwiched between each of the electrode layer; and
- varying a physical property of selected of the separate insulating layers with different capacitance (Fig. 6, 652) whereby the resonance characteristics of the multi-layer component are adjusted (Abstract); except for varying the thickness of selected of the separate insulating layers such that the separate insulating layers are characterized by at least two different thicknesses.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the thickness of selected of the separate insulating layers such that the separate insulating layers are characterized by many different thicknesses, since it is known in the art that the physical property or capacitance is dependent also on the thickness (h) of the insulating layer based on the mentioned equation in column 8, lines 41-44, therefore one of ordinary skill in the art, by applying the mentioned equation (Col. 5, line 10), can vary the capacitance of the conductor (Fig. 10, 1022) by varying the dielectric constant (Fig. 10, 1052), the thickness of the insulating layers (Fig. 10, items 1010 or 1012 or 1014) of the substrate in order to come up with the desired capacitance for the conductor on that substrate.

Again, Applicants respectfully traverse the various views of the Office Action regarding alleged correspondence of the presently claimed subject matter and the cited portions of Novak. The Office Action seems to understand that there is an important

deficiency of Novak relative to independent claim 13 since it notes that [all] the subject matter of claim 13 is shown “except for varying the thickness of selected of the separate insulating layers such that the separate insulating layers are characterized by at least two different thicknesses.” However, there is respectfully no articulated basis (other than apparent hindsight) by which Novak is said to bridge by itself to the presently claimed subject matter, including the above “two different thicknesses” aspect.

With regard to independent claim 13, several aspects of such claim are also not disclosed in Novak. Claim 13 sets forth a step of varying the thickness of selected of the separate insulating layers in a multi-layer component. The varied thickness arrangement is such that there are insulating layers of at least two different thicknesses. Various examples of such feature set are illustrated in Figs. 6A-6E of the subject application, and include such configurations as those referred to as continuous thickness variation, patterned thickness variation, and matched variable thickness variation.

If anything, the knowledge of one of ordinary skill in the art teaches away from how one of ordinary skill in the art might “interpret” Novak vis-à-vis the present subject matter, even assuming arguendo that one of ordinary skill in the art would somehow seek to experiment with modifying Novak.

Specifically, in the ordinary course of events, layers are generally preferred to be held at constant thickness, since that is the most production expedient. Changes to layers begin to introduce complex phenomena at present higher frequencies at which the industry presently uses various capacitance values in a single chip, particularly as one seeks to meet demands for operability at multiple frequencies. Therefore, it is generally counter-intuitive (i.e., non-obvious) to one of ordinary skill in the art to combine different thicknesses of layers, as presently claimed.

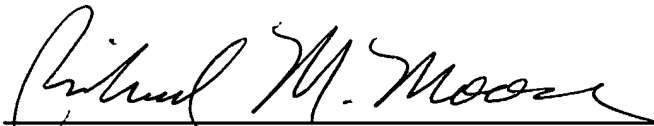
Such is all the more an important consideration when understanding that the subject matter relied on by the Office Action aren't in fact even layers, but “capacitive islands”. Therefore, Novak by itself respectfully as a matter of law can not render obvious the presently claimed subject matter of independent claim 13.

CONCLUSION:

Inasmuch as all outstanding issues have been addressed, it is respectfully submitted that the present application, including active claims 6-13, is in complete condition for issuance of a formal Notice of Allowance, and action to such effect is earnestly solicited. The Examiner is invited to telephone the undersigned at his convenience should only minor issues remain after consideration of this response in order to permit early resolution of the same.

Respectfully submitted,

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